

Precipitation global seasonal mean (mm/day)					
	JJA	SON	DJF	MAM	Annual
OBS	2.76	2.65	2.63	2.65	2.67
CNTRL (5yr)	4.23	3.62	3.57	3.62	3.76
SSiB (5yr)	3.66	3.25	3.38	3.24	3.38
CNTRL-OBS	1.47	0.97	0.94	0.97	1.09
SSiB-OBS	0.90	0.60	0.75	0.59	0.71

Precipitation global seasonal mean over land(mm/day)					
	JJA	SON	DJF	MAM	Annual
OBS	2.21	1.76	1.58	1.62	1.79
CNTRL (5yr)	3.77	2.89	2.44	3.09	3.05
SSiB (5yr)	2.69	2.08	2.04	2.33	2.29
CNTRL-OBS	1.56	1.13	0.86	1.47	1.26
SSiB-OBS	0.48	0.33	0.46	0.71	0.49

Table 1a

	Precipitation global monthly mean (mm/day)											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OBS	2.62	2.62	2.60	2.65	2.70	2.76	2.80	2.74	2.67	2.62	2.66	2.65
CNTRL (5yr)	3.63	3.55	3.54	3.53	3.79	4.29	4.27	4.13	3.81	3.58	3.47	3.52
SSiB (5yr)	3.45	3.38	3.25	3.20	3.26	3.68	3.72	3.59	3.41	3.14	3.19	3.31
CNTRL-OBS	1.01	0.93	0.94	0.88	1.09	1.54	1.47	1.40	1.14	0.96	0.81	0.87
SSiB-OBS	0.83	0.76	0.65	0.55	0.56	0.92	0.92	0.86	0.75	0.52	0.53	0.66

	Precipitation global over land monthly mean (mm/day)											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
OBS	1.57	1.62	1.57	1.59	1.70	2.05	2.33	2.25	1.92	1.72	1.63	1.56
CNTRL (5yr)	2.42	2.58	2.84	3.13	3.29	3.68	3.87	3.77	3.37	2.79	2.51	2.33
SSiB (5yr)	2.02	2.07	2.27	2.39	2.33	2.52	2.78	2.77	2.25	2.02	1.99	2.02
CNTRL-OBS	0.85	0.97	1.27	1.54	1.59	1.63	1.54	1.52	1.44	1.07	0.88	0.77
SSiB-OBS	0.45	0.46	0.70	0.80	0.63	0.48	0.45	0.52	0.33	0.30	0.36	0.46

Table 1b

Table 2: DJF observed, GCM, and ETA/GCM mean, systematic error (SE), root mean square error (RMSE), and spatial correlation (SCorr) for precipitation [mm/d] and surface air temperature [‘C] averaged over (a) South America (SA), (b) northern SA (NSA), (c) southern SA (SSA), and (d) the Andes mountain range (AMR). Land points only.

SA

Precipitation [mm/d]					Surface Temperature [‘C]			
	Mean	SE	RMSE	S Corr	Mean	SE	RMSE	S Corr
OBS	4.69				24.14			
GCM	5.40	0.72	2.97	0.50	23.36	-0.78	2.83	0.87
ETA/GCM	4.12	-0.57	2.33	0.58	23.94	-0.20	2.55	0.85

NSA

Precipitation [mm/d]					Surface Temperature [‘C]			
	Mean	SE	RMSE	S Corr	Mean	SE	RMSE	S Corr
OBS	5.16				25.43			
GCM	6.85	1.69	3.55	0.28	23.22	-2.21	2.52	0.96
ETA/GCM	4.22	-0.94	2.74	0.44	23.83	-1.60	2.05	0.92

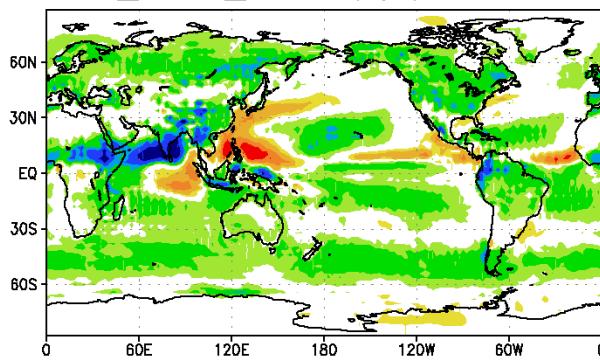
SSA

Precipitation [mm/d]					Surface Temperature [‘C]			
	Mean	SE	RMSE	S Corr	Mean	SE	RMSE	S Corr
OBS	3.97				22.18			
GCM	3.22	-0.75	1.75	0.78	23.56	1.38	3.23	0.93
ETA/GCM	3.97	0.00	1.49	0.81	24.12	1.94	3.14	0.92

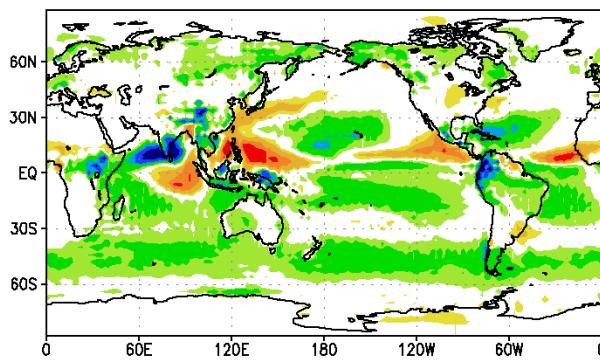
AMR

Precipitation [mm/d]					Surface Temperature [‘C]			
	Mean	SE	RMSE	S Corr	Mean	SE	RMSE	S Corr
OBS	2.95				20.03			
GCM	4.35	1.40	3.37	0.61	19.76	-0.27	3.18	0.90
ETA/GCM	3.43	0.48	1.65	0.70	21.07	1.03	3.19	0.94

UCLA_AGCM_CNTRL(5yr)-CMAP JJA



UCLA_AGCM_SSiB(5yr)-CMAP JJA



UCLA_AGCM_SSIB-CNTRL (5yr) JJA

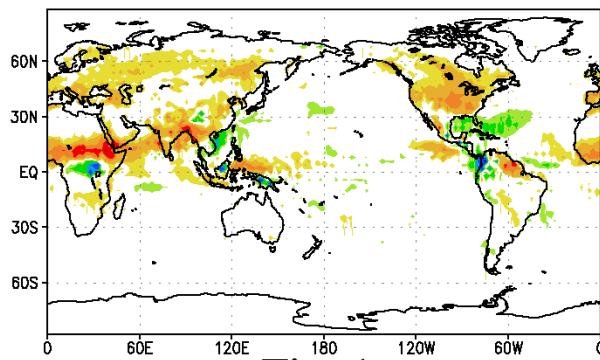
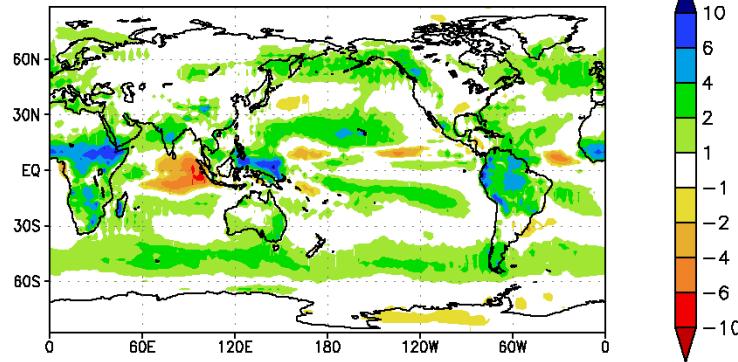
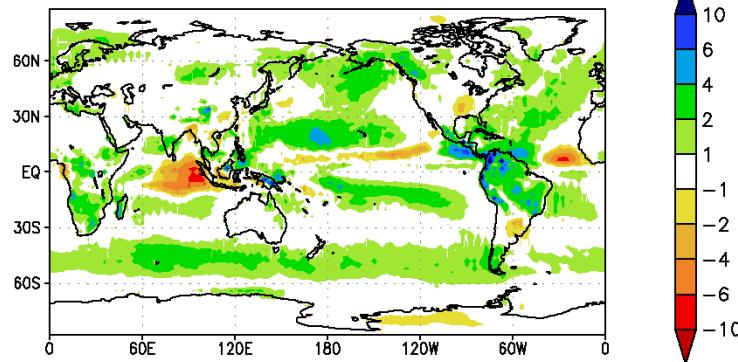


Fig. 1a

UCLA_AGCM_CNTRL(5yr)-CMAP SON



UCLA_AGCM_SSIB(5yr)-CMAP SON



UCLA_AGCM_SSIB-CNTRL (5yr) SON

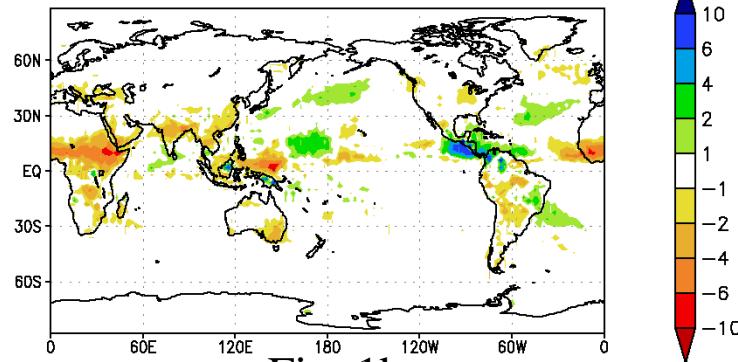
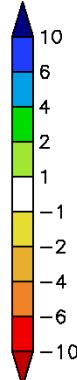
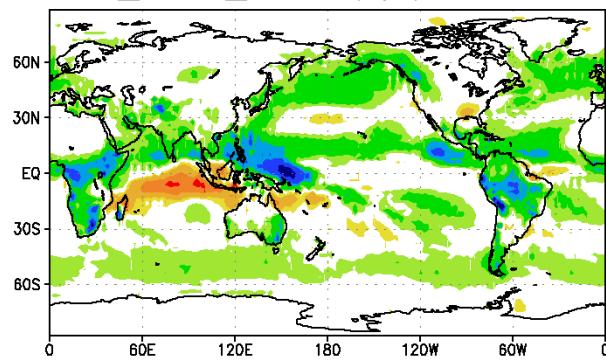
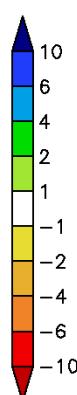
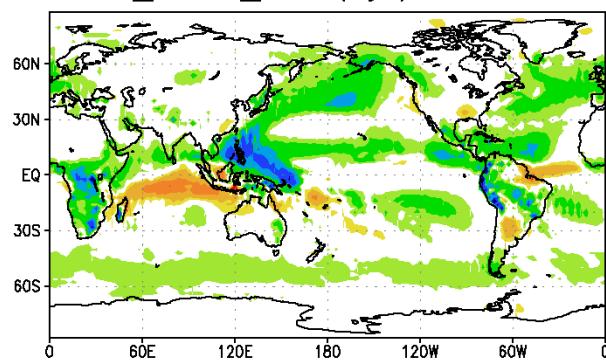


Fig. 1b

UCLA_AGCM_CNTRL(5yr)–CMAP DJF



UCLA_AGCM_SSIB(5yr)–CMAP DJF



UCLA_AGCM_SSIB–CNTRL (5yr) DJF

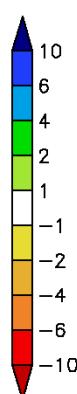
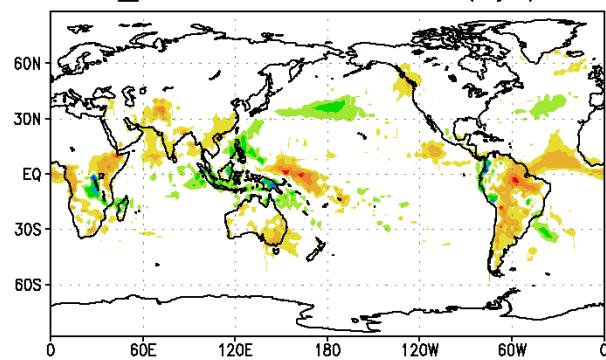
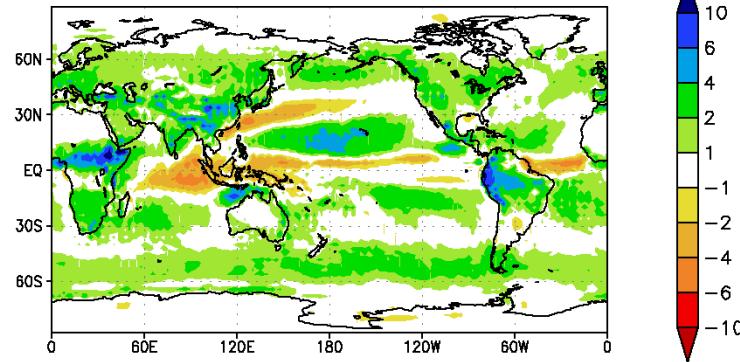
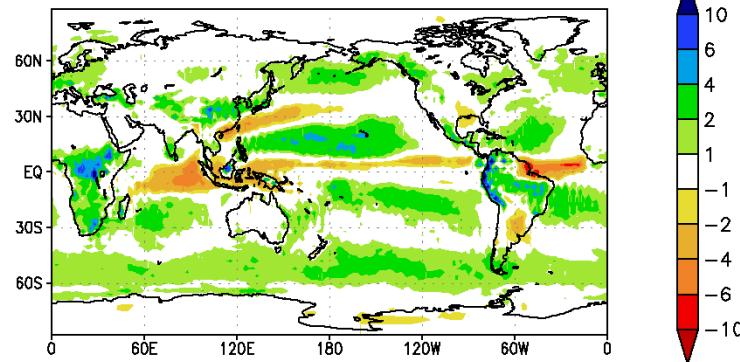


Fig. 1c

UCLA_AGCM_CNTRL(5yr)-CMAP MAM



UCLA_AGCM_SSIB(5yr)-CMAP MAM



UCLA_AGCM_SSIB-CNTRL (5yr) MAM

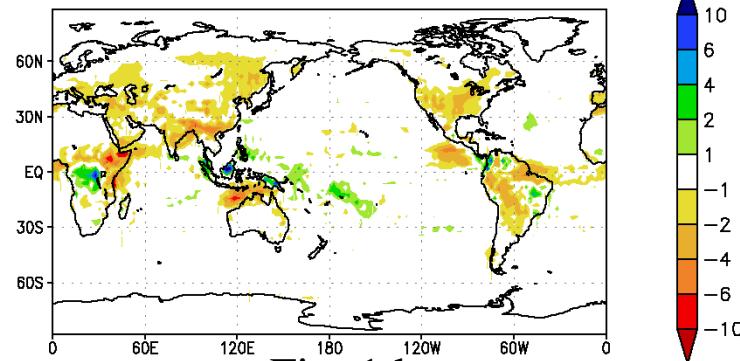
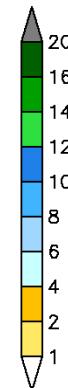
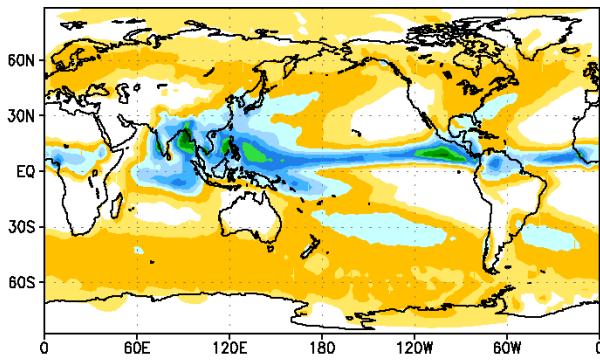
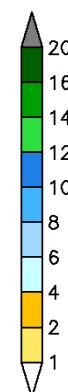
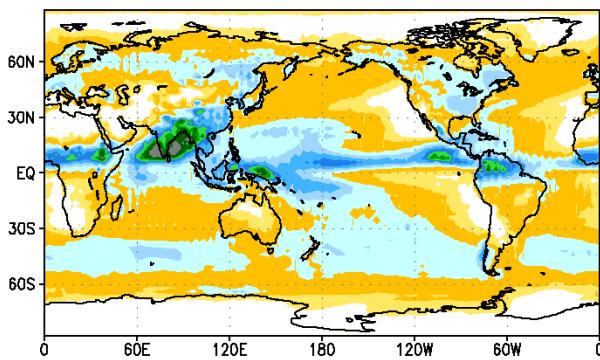


Fig. 1d

CMAP (79-01) JJA



UCLA_AGCM_CNTRL(5yr) JJA



UCLA_AGCM_SSIB(5yr) JJA

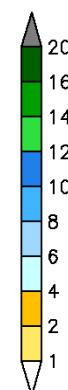
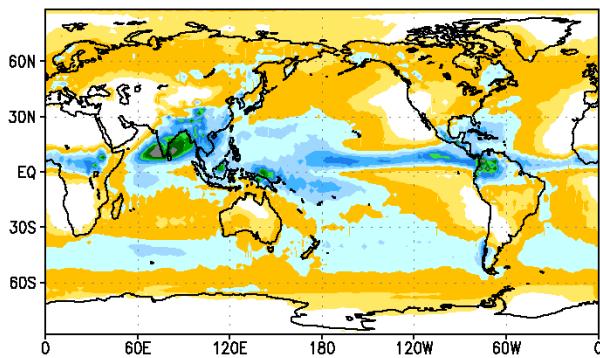
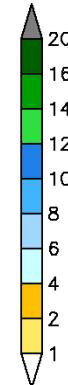
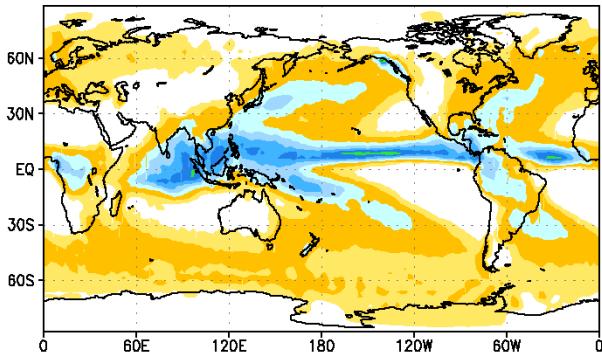
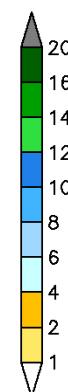
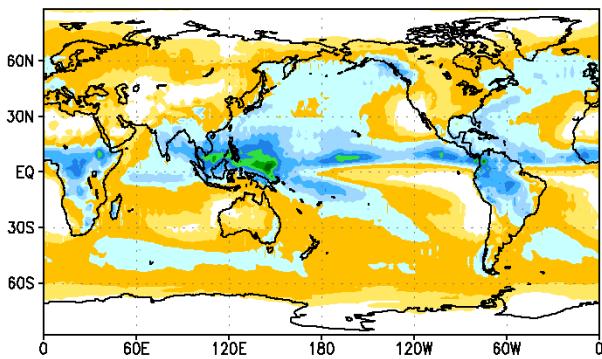


Fig. 1e

CMAP (79–01) SON



UCLA_AGCM_CNTRL(5yr) SON



UCLA_AGCM_SSIB(5yr) SON

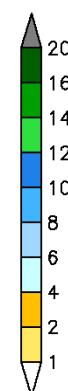
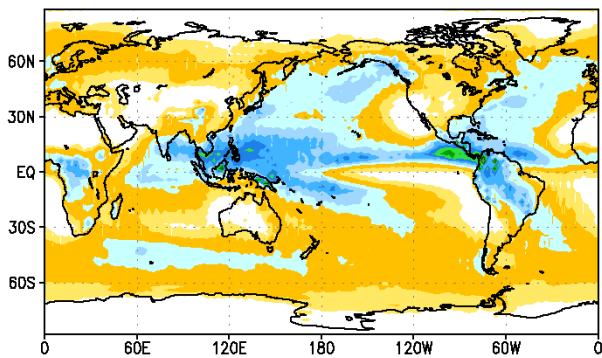
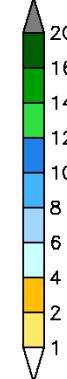
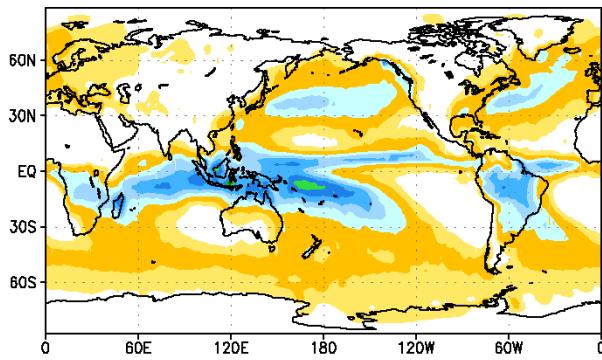
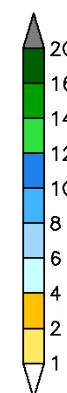
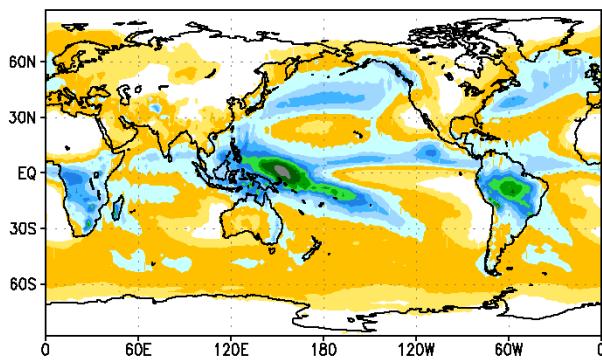


Fig. 1f

CMAP (79-01) DJF



UCLA_AGCM_CNTRL(5yr) DJF



UCLA_AGCM_SSiB(5yr) DJF

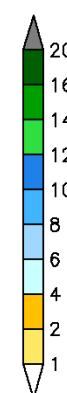
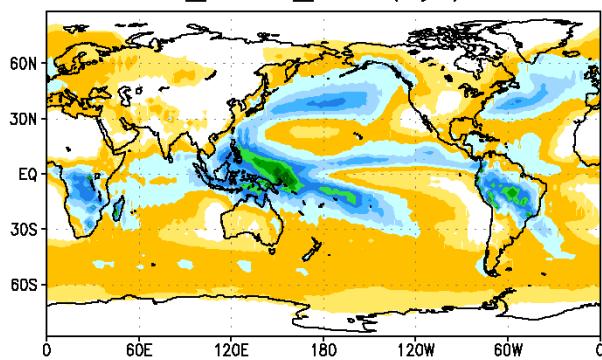
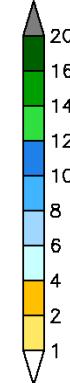
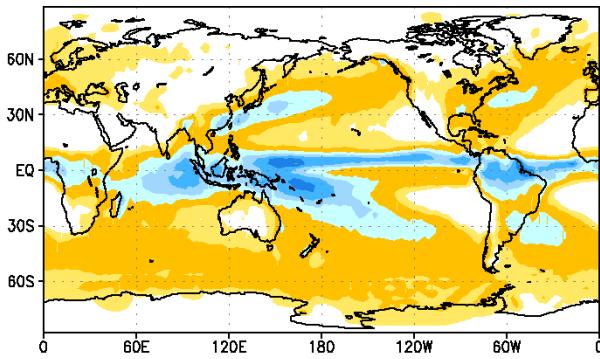
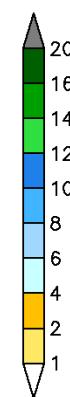
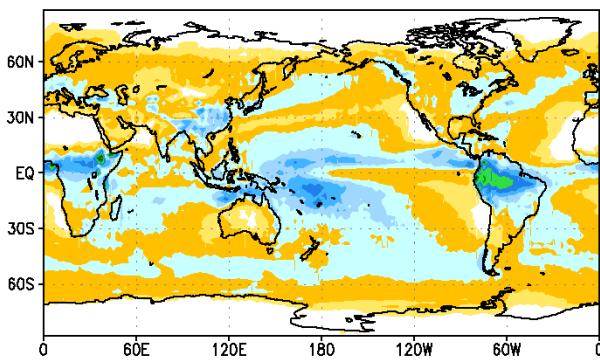


Fig. 1g

CMAP (79–01) MAM



UCLA_AGCM_CNTRL(5yr) MAM



UCLA_AGCM_SSIB(5yr) MAM

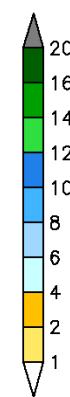
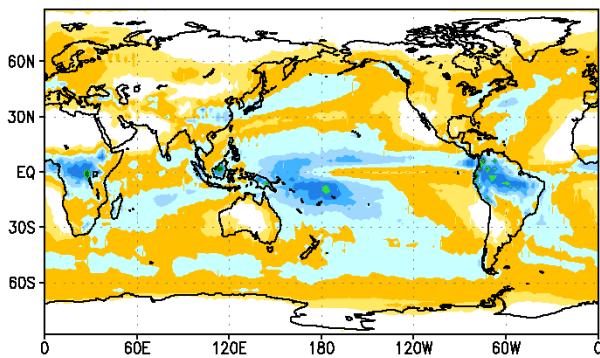


Fig. 1h

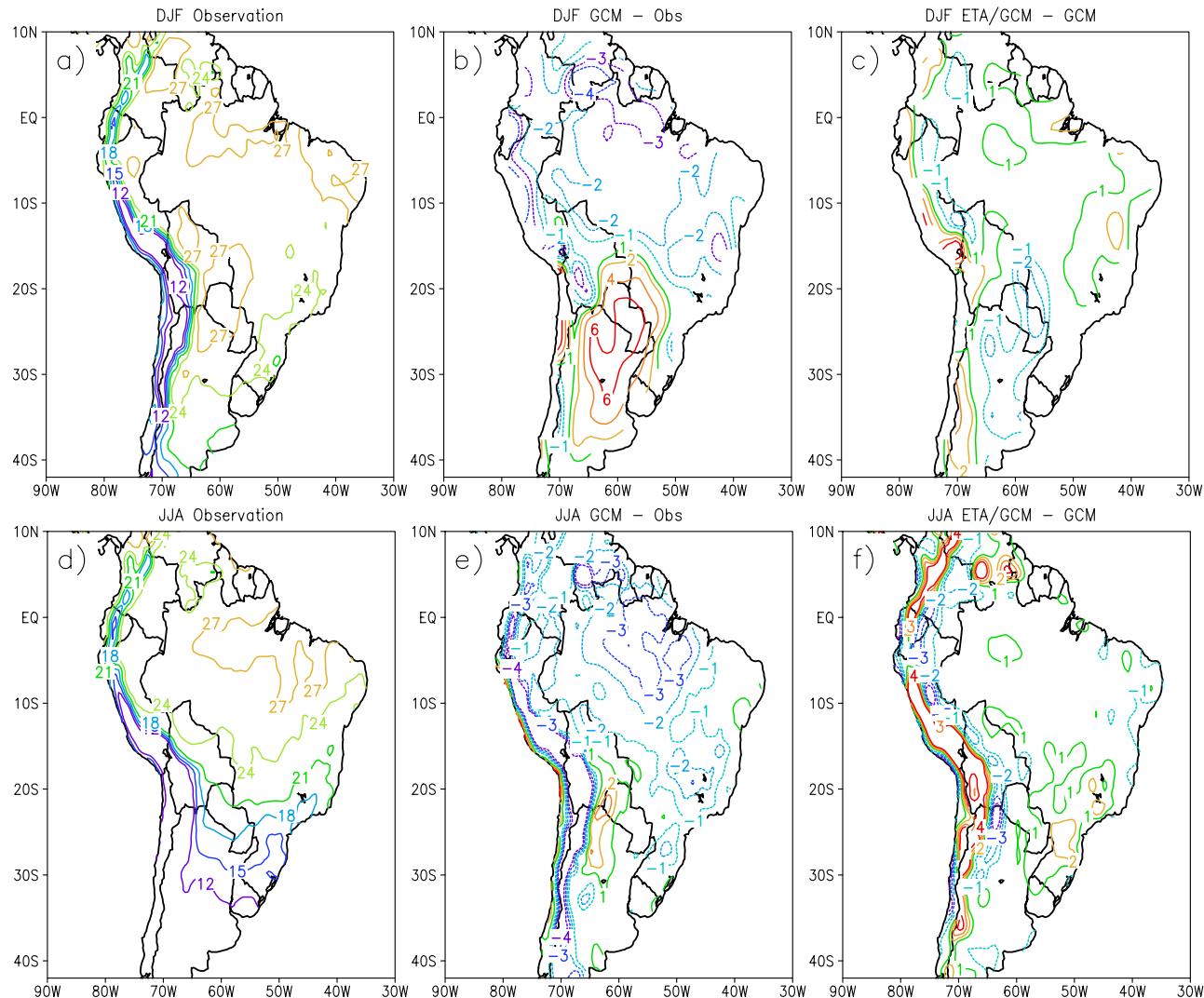


Fig. 2: (a) Observed DJF mean surface temperature; (b) DJF GCM temperature minus observation; (c) DJF ETA/GCM minus GCM temperature. (d) Observed JJA mean surface temperature; (e) JJA GCM temperature minus observation and (f) JJA ETA/GCM - GCM temperature [°C].

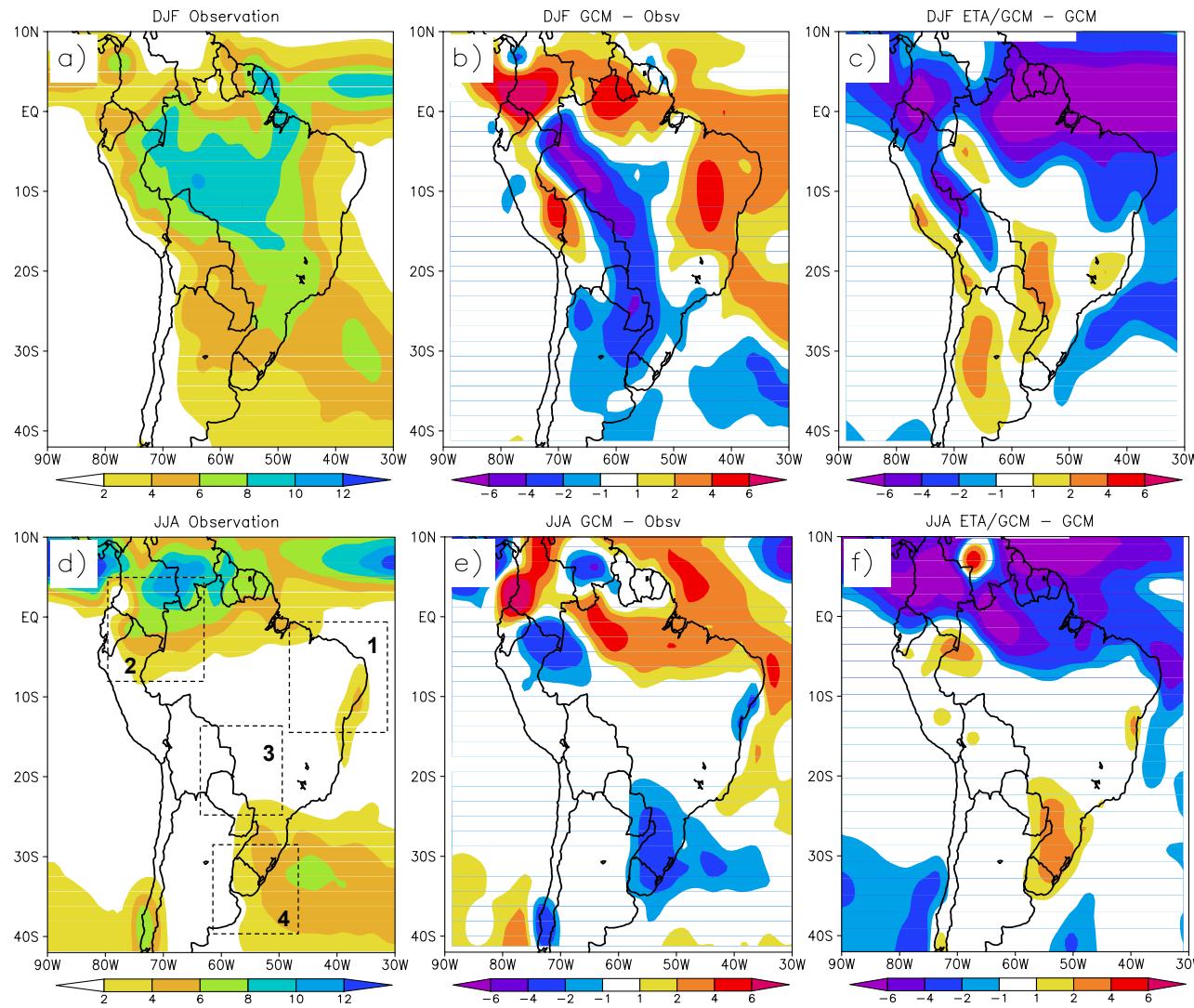
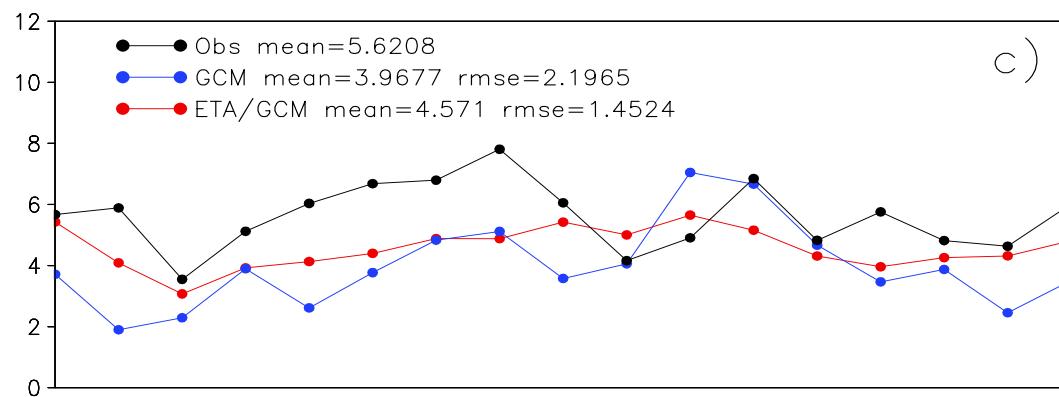
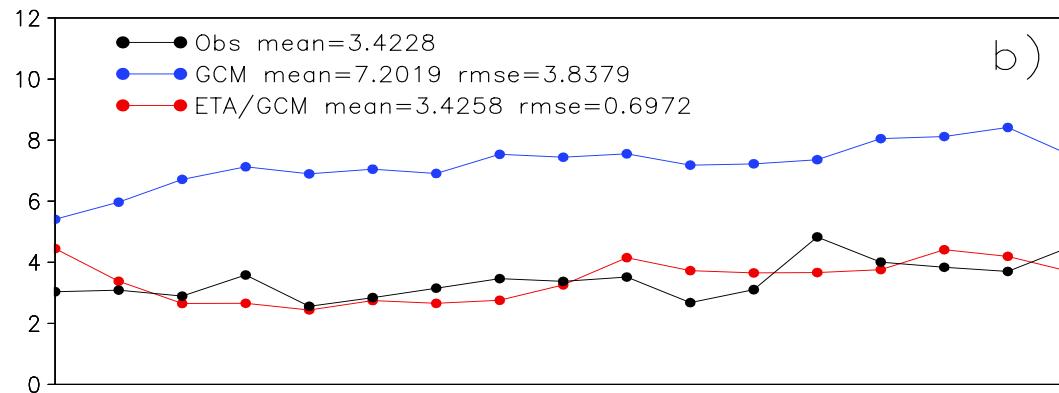
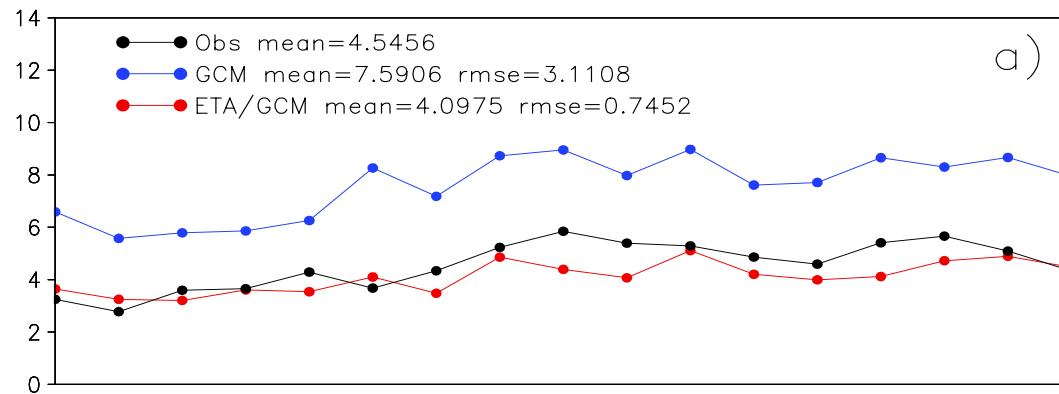


Fig. 3: (a) Observed DJF mean precipitation; (b) DJF GCM minus observation; (c) DJF ETA/GCM minus GCM. (d) Observed JJA mean precipitation; (e) JJA GCM minus observation and (f) JJA ETA/GCM minus GCM. Precipitation in mm day^{-1} . Fig3c shows the sub-regions used for the precipitation time series. 1) northeast Brazil; 2) northwest South America; 3) foothills of central Andes, and 4) La Plata river basin



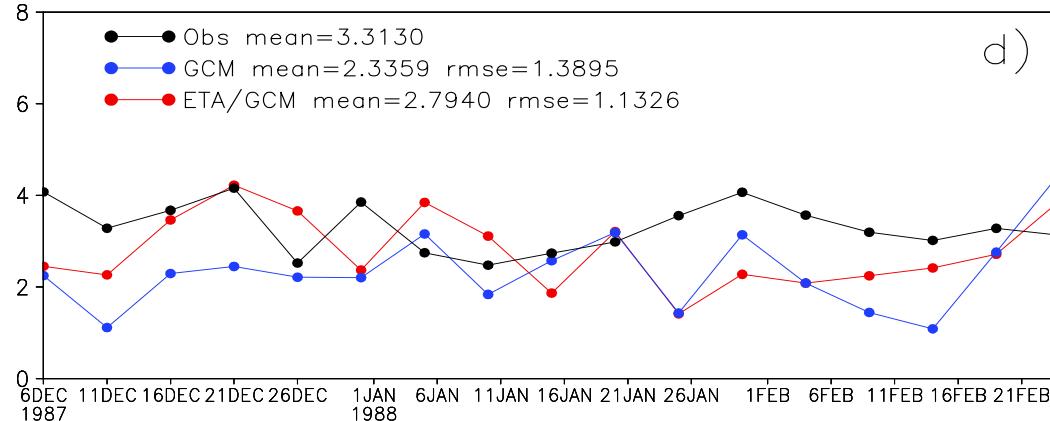


Fig. 4: Time series of 5-day mean precipitation during DJF for (a) sub-region 1; (b) sub-region 2; (c) sub-region 3 and (d) sub-region 4 [mm day^{-1}]. Seasonal mean and rmse for each model also shown. Sub-regions in Figure 3c.

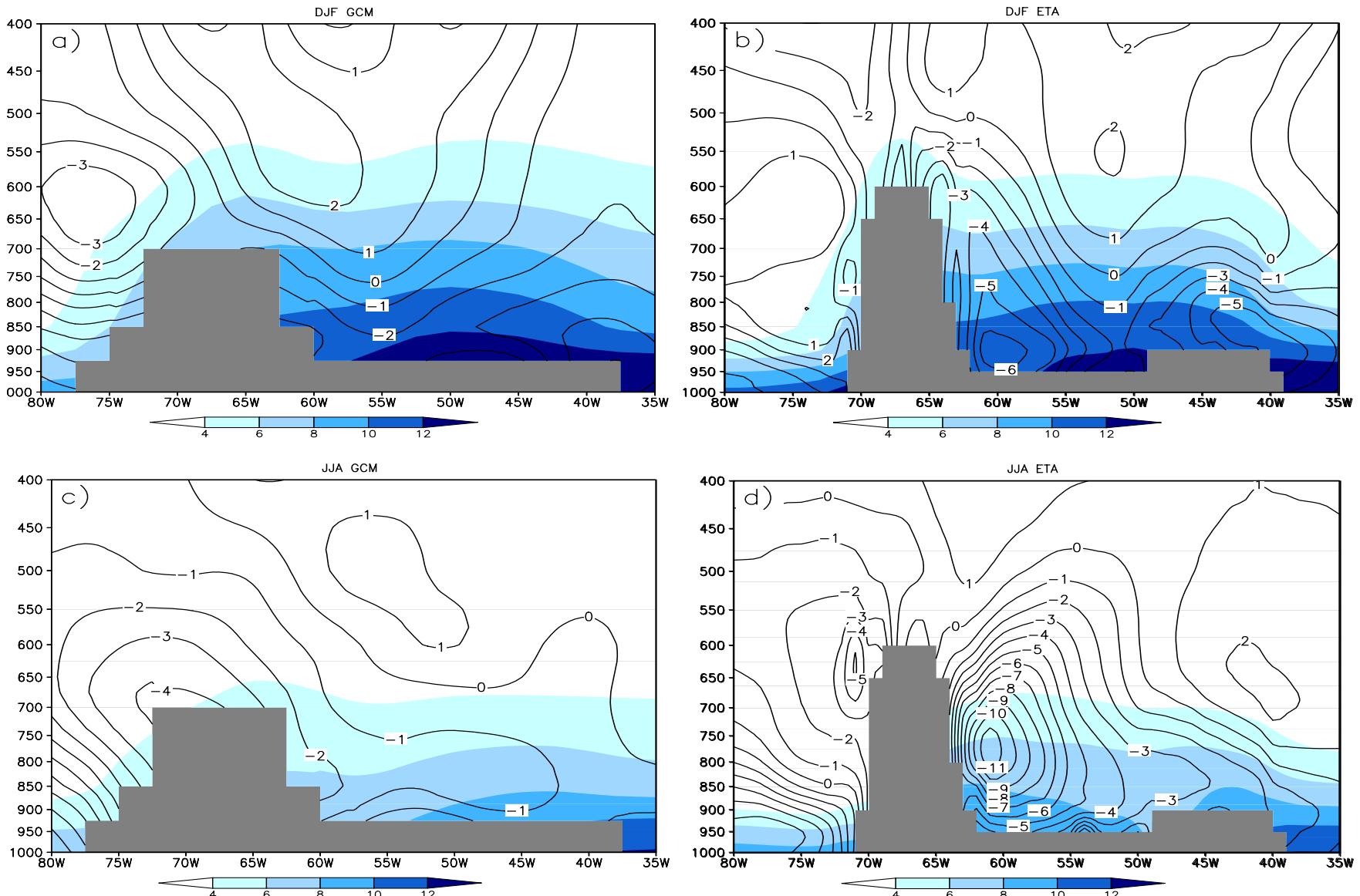


Fig. 5: Cross section of mean meridional wind speed [m s⁻¹] (contour lines) and specific humidity [g kg⁻¹] (shading) along 20.0°S for (a) GCM and (b) ETA/GCM during DJF and (c) GCM and (d) ETA/GCM during JJA.